

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GURTEJ S. SANDHU

Appeal No. 2004-0016
Application No. 09/496,081

ON BRIEF

Before KIMLIN, WARREN and OWENS, Administrative Patent Judges.
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 32, 36-39 and 43-45. The examiner has withdrawn the rejection of claim 35 on appeal and objected to the claim as being dependent upon a rejected base claim (see page 2 of Answer, last paragraph). Claim 32 is illustrative:

32. A capacitor in a semiconductor device, said capacitor comprising:

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a bottom capacitor plate consisting essentially of amorphous TiN;

a layer of dielectric material overlying said bottom capacitor plate; and

a top capacitor plate over lying [sic, overlying] said layer of dielectric material

The examiner relies upon the following references as evidence of obviousness:

Gonzalez et al. (Gonzalez)	5,168,073	Dec. 01, 1992
Sandhu et al. (Sandhu)	5,335,138	Aug. 02, 1994
Lee et al. (Lee)	2,245,762	Jan. 01, 1992
(United Kingdom Patent Application)		

Appellant's claimed invention is directed to a capacitor in a semiconductor device wherein the capacitor comprises, inter alia, a bottom capacitor plate consisting essentially of amorphous TiN. According to appellant, "[t]he capacitor will function as a storage capacitor for a semiconductor device and particularly for a dynamic random access memory device" (page 2 of principal brief, paragraph five).

Appealed claims 32, 36, 39 and 43 stand rejected under 35 U.S.C. § 103 as being unpatentable over Gonzales in view of Lee. Claims 37, 38, 44 and 45 stand rejected under 35 U.S.C. § 103 as being unpatentable over Gonzales in view of Lee and Sandhu.

We have carefully reviewed the respective positions advanced by appellant and the examiner. In so doing, we find ourselves in agreement with appellant that the examiner has failed to establish a prima facie case of obviousness for the claimed subject matter. Accordingly, we will not sustain the examiner's rejections.

The examiner appreciates that "González fails to teach a bottom capacitor plate consisting essentially of amorphous TiN" (page 4 of Answer, last paragraph). Instead, Gonzales discloses a bottom capacitor plate comprising TiN and tungsten. However, citing Lee's disclosure of a semiconductor device having an amorphous TiN layer in a contact hole structure, the examiner concludes that:

[I]t would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by González to include a bottom capacitor plate consisting essentially of amorphous TiN, as suggested by Lee, in order to improve the characteristics of the diffusion barrier at a contact hole portion and prevent the occurrence of defects such as cracks, as disclosed on page 5, lines 22-31.

(Page 4 of Answer, last paragraph). We understand the examiner's position that it would have been obvious to replace the bottom capacitor plate of Gonzales, comprising TiN and tungsten, with a bottom capacitor plate consisting essentially of only TiN.

The rejection cannot stand because the examiner has failed to establish that one of ordinary skill in the art would have found it obvious to form a bottom capacitor plate with essentially only TiN. Gonzales, like Lee, discloses that TiN is a diffusion barrier between the N₊ junction and the tungsten, but Gonzales provides no teaching that the TiN layer, alone, can function as a bottom capacitor plate without the tungsten. Lee, likewise, is deficient in providing such a teaching since, as acknowledged by the examiner, Lee is not directed to a capacitor but only, at best, "a generic contact structure which can be provided on different types of semiconductor devices" (page 7 of Answer, paragraph one). Hence, without the teaching that a layer consisting essentially of TiN can function as a bottom capacitor plate, the examiner's rejection lacks the requisite factual support. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 177-78 (CCPA 1967).

Sandhu, cited by the examiner for disclosing a capacitor including a high dielectric constant material and particular capacitor structures, does not alleviate the deficiency of the combined teachings of Gonzales and Lee discussed above.

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In conclusion, based on the foregoing, the examiner's
decision rejecting the appealed claims is reversed.

REVERSED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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CHARLES F. WARREN)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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TERRY J. OWENS)	
Administrative Patent Judge)	

ECK:clm

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